

# Claims

- [c1] 1. An evaporation system comprising:
- an enclosure defining an evaporation region, a condensation region, and a liquid region;
  - a liquid in the liquid region, a surface of the liquid defining a volume of the evaporation and condensation regions;
  - a inlet in the evaporation region of the enclosure adapted to introduce an inlet feed into the enclosure;
  - an outlet in the liquid region of the enclosure adapted to drain the liquid from the enclosure, wherein the liquid drains from the outlet at least in part by the weight of the liquid, and wherein as liquid is drained through the outlet, the volume of the evaporation and condensation regions increases and the pressure in the evaporation and condensation regions decreases; and
  - wherein the inlet feed introduced through the inlet vaporizes in the evaporation region, condenses to a liquid in the condensation region, and the condensed liquid collects in the liquid region and wherein the flow through the outlet and the flow through the inlet is regulated to maintain a pressure in the evaporation region that tends to vaporize the inlet feed.
- [c2] 2. The system of Claim 1 with a blower between the evaporation region and the condensation region to maintain the condensation region at a higher pressure than the

evaporation region.

[c3] 3. The system of Claim 2 with a heat transfer system adapted and arranged to transfer heat from the condensation region to the evaporation system.

[c4] 4. The system of Claim 3 with an absorbing heat exchanger in the condensation region and a rejecting heat exchange in the evaporation region.

[c5] 5. The system of Claim 5 with the heat transfer system being a Rankine cycle heat transfer system.

[c6] 6. The system of Claim 2 with a heat transfer system adapted and arranged to transfer heat from the condensation region to the inlet feed.

[c7] 7. The system of Claim 6 with an absorbing heat exchanger in the condensation region and a rejecting heat exchange in the inlet feed.

[c8] 8. The system of Claim 7 with the heat transfer system being a Rankine cycle heat transfer system.

[c9] 9. The system of Claim 1 with a degasifier connected to the inlet feed.

[c10] 10. The system of Claim 1 the enclosure including a slurry section, and a refrigeration heat exchanged adapted and arranged to receive ice slurry from the slurry section and chill

a fluid directed across the heat exchanger.